(19) KOREAN INDUSTRIAL PROPERTY OFFICE (KR)
(12) PATENT JOURNAL
(11) PATENT NO. 1991-0004459 (B1)

(51) Int. Cl.[6]: D 01 F 8/06
D 01 F 6/66
(24) Registration Date: June 29, 1991

(21) Filing No.: 1988-0003879
(22) Filing Date: April 7, 1988
(65) Laid-Open No.: 1989-0016236
(43) Laid-Open Date: November 28, 1989
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(Bulletin No. 2351)

[There are no amendments to this patent.]

ABSTRACT

No contents

REPRESENTATIVE FIGURE:

Figure 1

SPECIFICATION

TITLE OF THE INVENTION

Method for Manufacturing Conjugated Fibers for Nonwoven Fabric

BRIEF DESCRIPTION OF THE FIGURE

Figure 1 is a cross section showing a conjugated fiber manufactured by the present invention.

* Explanation of numerals of the main parts of the figure

A: Ionomer-rich part

B: Low-melting-point polyethylene-rich part

C: High-melting-point core part

DETAILED EXPLANATION OF THE INVENTION

The present invention pertains to a method for manufacturing conjugated fibers for a nonwoven fabric with excellent thermal adhesion.

Specifically, it pertains to a method for manufacturing conjugated fibers for a nonwoven fabric with excellent thermal adhesion, characterized by the fact that a high-density polyethylene or a straight-chain low-density polyethylene or low-density polyethylene ionomer mixture as a sheath component and a polypropylene or polyethylene terephthalate as a core component are conjugation-spun in a sheath-core form.

In general, the method that prepares a staple with a conjugated component using thermoplastic resins with different melting points, that heat-treats it at the melting point of the component with a high melting point, and manufactures a nonwoven fabric by forming a self-adhesion point is already been well known; in particular, when a polyolefin resin is adopted as the component with a low melting point, it has been broadly used for infant diapers, sanitary napkins, filters, etc., due to its excellent characteristics such as excellent mechanical strength, low specific gravity, corrosion resistance, and water resistance of the polyolefin.

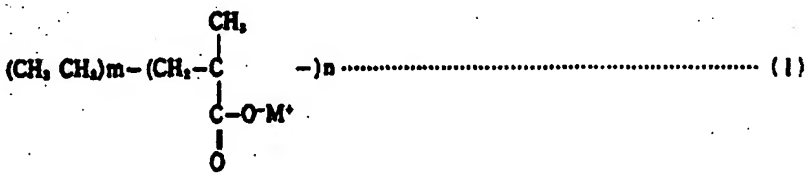
However, since such a staple with a conjugated component is more expensive than a staple with a single component, the staple with a conjugated component and the staple with a single component have been mixed at a fixed ratio, heat-treated, and adhered when a nonwoven

fabric is manufactured. In this case, when the component with a low melting point of the conjugated component was a polyolefin resin, since there was no active group in the polyolefin resin itself, the adhesion to the staple with a single component was deficient, so that its usage in padding or quilting was difficult.

In order to solve such an adhesion problem, a method for raising the temperature of the calender was proposed; however, when such a method was adopted, the final surface was hardened, so that a soft hand could not be exerted. Also, in order to improve the adhesive strength and to lower the melting point, a method that blends an ethylene-vinyl acetate resin with the polyolefin or that manufactures a conjugated fiber using an enhanced polyester with a low melting point was introduced. However, since such a method could not exert a soft hand, it was not suitable for the manufacture of a thin-base nonwoven fabric.

Therefore, the present invention is created to solve all the conventional problems, and its purpose is to provide a sheath-core type of conjugated fiber for a nonwoven fabric in which the adhesive strength is improved while maintaining a soft hand. The constitution of the present invention is explained in detail as follows.

The present invention pertains to a method for manufacturing conjugated fibers for a nonwoven fabric with excellent thermal adhesion, characterized by the fact that a sheath component is prepared by adding 0.1-10.0 wt% of an ionomer represented by the following general formula (I) to a high-density polyethylene, which is a polyolefin type, or a straight-chain low-density polyethylene or low-density polyethylene, and is conjugation-spun in a sheath-core form, using polypropylene or polyethylene terephthalate as a core component.



(I)

(Here, m and n represent integers of 10-100, and M^+ represents a metal ion of Zn or Na.)

As the high-density polyethylene, low-density polyethylene, or polypropylene used in the present invention, an ethylene or propylene homopolymer and a butene-1 compound mainly composed of said homopolymer can be used.

Also, in these polymers or mixture, if necessary, stabilizers such as an antioxidant and ultraviolet light absorbent that are ordinarily added to a polyolefin resin, or additives such as a colorant, lubricant, and antistatic agent, can be added. As a method that adds and mixes the ionomer with the high-density polyethylene or the straight-chain low-density polyethylene or

low-density polyethylene as the sheath component in the present invention, ordinary methods using an extruder, Banbury mixer, or static mixer are also possible.

A preferable cross-sectional shape of the conjugated fiber manufactured by the present invention is shown in Figure 1; it consists of a part (A) in which the ionomer is more richly scattered than polyethylene with a low melting point, a part (B) in which polyethylene with a low melting point is more richly scattered, and a core component (C) with a high melting point.

As seen from Figure 1, in order to obtain a preferable cross section of the conjugated fiber of the present invention, the melt index (MIi) of the ionomer and the melt index (MIo) of the high-density polyethylene or straight-chain low-density polyethylene or low-density polyethylene should satisfy the following relationship equation:

$$MIi/MIo \geq 1$$

Also, the melt index of the ionomer and the high-density polyethylene or straight-chain low-density polyethylene or low-density polyethylene used in the present invention should be in a range of 5-40. If the melt index is smaller than 5, the spinnability and the stretch are lowered; if the melt index is greater than 40, the adhesive strength is lowered, so that the strength of the nonwoven fabric is lowered. Also, if the value of MIi/MIo is less than 1, the objective of the present invention cannot be achieved, not to mention the fact that the fiber with the cross section as shown in Figure 1 cannot be obtained.

If the amount of ionomer added to the polyolefin as the sheath component is 0.1 wt% or less, the adhesion and the hand are not satisfactory, and if the amount is 10.0 wt% or more, it is not suitable for diapers, sanitary napkins, etc., due to the absorption effect of ions present in the ionomer.

APPLICATION EXAMPLES 1 AND 2

Using a mixture in which a poly(ethylene-co-methacrylic acid) ionomer with a melting point of 91°C was added to a low-density polyethylene with a melting point of 130°C as the sheath component and a polyropylene with a melting point of 160°C and MI of 20 as the core component, a nonstretched yarn with a conjugation ratio of 60:40 was obtained by a sheath-core type of conjugation spinneret with a spinneret hole diameter of 0.5 mm and stretched at a rate of 3.5 times by an ordinary stretcher, so that a stretched yarn of 100°/30 Fil was obtained. A conjugated staple was then manufactured using a stuffer.

The above-mentioned staple was mixed with a polyester staple at 50:50, cut to $30/m_2$ [sic], and thermally adhered by a calender (150°C x 60 n/min).

The CD strength and the hand of the web measured are shown in Table 1.

COMPARATIVE EXAMPLE 1

The same method as that of Application Examples 1-2 was applied, except for using only the low-density polyethylene as the sheath component; the results are summarized in Table 1.

Table 1

Classification		Application Example 1	Application Example 2	Application Example 3
MI	Low-density polyethylene	25	25	25
	Ionomer	30	30	–
Amount of ionomer added (wt%)		0.5	1.0	–
Spinning temperature (°C)		240	240	240
Stretch temperature (°C)		80	80	80
CD strength of web (kg)		1.25	1.42	0.56
Hand of web		Good (soft)	Good (soft)	Poor (hard)

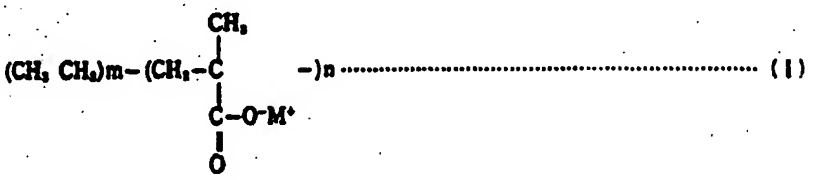
Measuring methods:

(1) Melt index (MI): According to ASTM-D-1238

(2) CD strength of web: 12 pieces of oblong specimens with a width of 1 cm and a length of 15 cm were prepared and measured by an Instron tensile tester.

CLAIMS

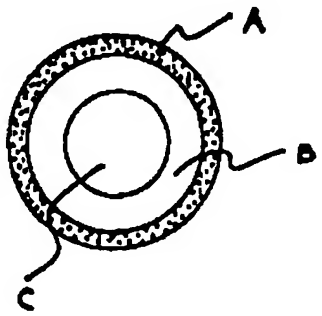
1. A method for manufacturing conjugated fibers for a nonwoven fabric with excellent thermal adhesion, characterized by the fact that a sheath component is prepared by adding 0.1-10.0 wt% of an ionomer represented by the following general formula (I) to a high-density polyethylene, which is a polyolefin, or a straight-chain low-density polyethylene or low-density polyethylene and is conjugation-spun in a sheath-core form, using polypropylene or polyethylene terephthalate as the core component.



(here, m and n represent integers of 10-100, and M^+ represents a metal ion of Zn or Na.)

2. The method of Claim 1, characterized by the fact that the ratio (MIi/MIo) of the melt index (MIi) of the ionomer and the melt index (MIo) of the high-density polyethylene or straight-chain low-density polyethylene or low-density polyethylene is 10 or more.

3. The method of Claim 2, characterized by the fact that the
the melt index of the ionomer and the high-density polyethylene or straight-chain low-density polyethylene or low-density polyethylene is in a range of 5-40.



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August 28, 2002